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Results of the Puritan-American Museum Expedition to Western Mexico

4. The Scorpions

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There have been no important systematic works on the Mexican scorpion fauna since the publication in 1931-1932 of "Los scorpiones de Mexico" by the late Carlos C. Hoffmann of Mexico City. In this classic contribution almost all the then known Mexican species were described and illustrated in superlative fashion. This paper was based on an abundant material from much of Mexico but lacked adequate representation from the northwestern states and the peninsula of Baja California. It is of importance to note here that the basic scorpion collection of Hoffmann, consisting of types, paratypes, and representatives of most of the species, is deposited in the collections of the American Museum of Natural History. Much material is also to be found in the Instituto de Biología in Mexico City.

The present paper is largely concerned with specimens of the arachnid Order Scorpionida taken during early 1957 by the Puritan-American Museum Expedition to the islands off the shores of Baja California and western Mexico. It includes also consideration of a few specimens from the adjacent mainland collected by others. It is not too surprising that even in the limited material from this highly interesting region, which is rich in endemic species in many animal groups, there should be species of notable interest. To a distinctive new vejovid from West San Benito Island, I have given the name *Vejovis baueri* for Mr. Harry J. Bauer of Los Angeles in recognition of his outstanding contribution to the expedition. It gives me pleasure to name a centrurid from San

Martín Island *Centruroides zweifeli* for Dr. Richard G. Zweifel of the Department of Amphibians and Reptiles of the American Museum of Natural History. Credit for collecting the arachnid and insect material during much of the trip belongs to him. Two additional species from northern Baja California and the recording of *Vejovis boreus* from South Todos Santos Island enlarge the Mexican fauna by five species.

The privilege of studying cotypes of Wood's Baja California species was made possible by the authorities of the United States National Museum. To Dr. J. G. Clarke and Dr. Ralph Crabill I extend my sincere thanks for their cooperation.

FAMILY CHACTIDAE

Broteas alleni Wood

Scorpio allenii WOOD, 1863, Proc. Acad. Nat. Sci. Philadelphia, p. 107; 1863, Jour. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 5, p. 360.

Broteas alleni MARX, 1886, Proc. Ent. Soc. Washington, vol. 1, pp. 64, 91. EWING, 1928, Proc. U. S. Natl. Mus., vol. 73, art. 9, p. 6. HOFFMANN, 1931, An. Inst. Biol., Mexico, pp. 332-333.

Broteochactas allenii BANKS, 1910, Pomona College Jour. Ent., vol. 2, no. 2, p. 188.

DIAGNOSIS: This rare species was based on specimens collected at Cabo de San Lucas, Baja California, about one hundred years ago by J. Xantus de Vesey. The types form part of the collection of the United States National Museum. Horatio C. Wood, who named the species for his friend H. Allen, does not mention the number of examples available to him. The bottle with Wood's original label contains two specimens, the lectotype and a smaller specimen. In 1910, Banks mentioned that he had seen examples of *alleni* from Fort Tejon, California. Ewing later stated that there were two specimens in the United States National Museum collection from this same locality. It is well known that Xantus de Vesey collected extensively at Fort Tejon, California, as well as in Baja California. No example of *alleni* has turned up in California, the southwestern United States, or even in northern Baja California for one hundred years. It seems reasonably certain that all this material actually came from Cabo de San Lucas and that the California record must be regarded as spurious.

The discovery of an example of *Broteas alleni* from Isla Magdalena on the coast of southern Baja California is notable. The specimen is presumed to be a female, inasmuch as it exhibits certain important differences from the two types which I have studied. The hands are crested and heavily granulose, instead of being quite smooth, and they

TABLE 1
MEASUREMENTS (IN MILLIMETERS) OF *Broteas alleni* WOOD

	Male, Type	Female
Total length	39.0	34.6
Carapace		
Length	5.0	4.8
Width at side eyes	2.7	2.7
Width at caudal edge	5.0	4.5
Preabdomen, length	14.0	13.5
Postabdomen, length	20.0	16.3
Segment I		
Length	2.0	2.1
Width	2.7	2.6
Segment II		
Length	2.3	2.5
Width	2.5	2.3
Segment III		
Length	2.5	2.7
Width	2.3	2.1
Segment IV		
Length	3.0	3.3
Width	2.2	2.0
Segment V		
Length	5.0	5.7
Width	2.0	1.8
Caudal segment, length	5.2	5.5
Vesicle		
Length	3.5	4.2
Width	2.1	2.2
Depth	1.7	2.0
Sting, length	1.5	1.5
Pedipalp, length	15.0	16.2
Femur		
Length	3.2	3.7
Width	1.7	1.7
Tibia		
Length	4.0	4.0
Width	1.7	1.7
Hand		
Length	7.8	8.5
Width	4.0	4.5
Palm length	5.0	5.6
Fixed finger	2.7	3.4
Movable finger, length	4.3	5.1
Combs, number of teeth	8	11

are larger and more sharply angled on the outer caudal edge. The keels on the postabdomen are less developed and set with smaller granules. For the present these differences are regarded as being merely sexual and not indicating specific rank. The sexing of scorpions is often difficult, and I am arbitrarily regarding the types as being males until more abundant material makes possible a more exact appraisal.

TYPE LOCALITY: Cabo de San Lucas, Baja California Sur; male herein designated as lectotype and immature paratypes in the United States National Museum.

OTHER RECORD: *Baja California Sur*: Puerto Magdalena, Isla Magdalena, March 17, 1957, R. Zweifel, one female.

The general coloration varies from yellowish to bright orange-brown, with the fingers of the hands dark reddish and with a dusky pattern on carapace and trunk. The two cotypes are brighter orange than the recently collected specimen from Isla Magdalena, which also shows the following pattern: carapace dull orange, with the eye tubercles black and a series of dusky purple radiations from the midline largely covering the surface; tergites dull yellow in base color but largely covered with dusky purple, each tergite showing a series of rounded pale spots; postabdomen yellow, but the fifth segment and vesicle of caudal segment dusky beneath, and the hands dull orange, with the crests and fingers reddish.

The carapace of the male cotype is about as long as broad, is considerably narrowed at the side eyes, and has the frontal margin emarginated at the middle. The surface is quite smooth and shining, but the shininess is in large part due to the fact that the specimen was beginning to molt, and already the carapace is separated from the new one beneath. The tergites of the preabdomen are likewise quite smooth as seen under lower power. The carinae on the last tergite are rather weakly developed but are set with heavy granules.

The postabdomen is of moderate length, being about as long as the carapace and preabdomen. The basal two segments are broader than long, the third one is nearly as broad as long, and the fourth and fifth are longer to much longer than broad. The dorsal and lateral crests are well developed and armed with heavy teeth on the first four segments. On the fifth the dorsal ridges are more rounded but armed with distinct teeth. The median and lateral keels on the ventral surface are mostly distinct, but they are scarcely discernible on the first segment, smooth on the second, and more distinctly granulate on the caudal segments. The smooth caudal segment is suboval in shape, with a very short sting.

The pedipalp of the male cotype is short, quite smooth, and with the hand broad and heavy. The femur and tibia are short and thick, with heavy granules on the carinae. The hand is smooth and evenly convex as seen from above and has the crests scarcely evident. The palm is only a little longer than broad, and the fingers are short.

The basal piece of the combs is a large, broader than long plate about half as broad as the length of the combs. The combs have well-developed round fulcra, and the number of teeth in each comb is eight. In a smaller cotype, presumed to be a young male, there are 10 teeth in the comb.

The female from Isla Margarita presents various important differences. The carapace is somewhat more granular, with a conspicuous series on each side of the midline. The crests and keels on the postabdomen are less well developed and provided with weaker teeth or granules. The hand is granulose over most of its surface and has the digital and accessory keels distinct and heavily granular. The comb has 11 teeth.

FAMILY VEJOVIDAE

Vejovis nitidulus C. L. Koch

Vejovis nitidulus C. L. KOCH, 1843, Die Arachniden, vol. 10, p. 4, fig. 758. HOFFMANN, 1931, An. Inst. Biol., Mexico, pp. 364-372, figs. 27-29.

The single specimen recorded below, which is of unknown sex, is assigned to this polytypic species with reasonable certainty, but its placement to subspecies must await additional material. Puerto Magdalena Island is well outside the ranges of the known subspecies, which are as follows:

Vejovis nitidulus nitidulus C. L. Koch: Oaxaca, where it is the most abundant member of the genus found in the field, especially under stones.

Vejovis nitidulus nigrescens Pocock: Central states of Mexico, in Guanaajuato, Queretaro, and Hidalgo and parts of the bordering states, where it lives up to about 2000 meters in altitude.

Vejovis nitidulus intermedius Borelli: Dinamita, Durango, and Sierra de Guadalupe, Distrito Federal, regarded as a high-mountain form ranging above 2200 meters in altitude.

RECORD: *Baja California Sur*: Puerto Magdalena, Isla Magdalena, March 17, 1957, R. Zweifel, one specimen.

Vejovis mexicanus C. L. Koch

Vaejovis mexicanus C. L. KOCH, 1836, Die Arachniden, vol. 3, p. 51.

Vejovis mexicanus HOFFMANN, 1931, An. Inst. Biol., Mexico, pp. 392-401, figs. 39-41.

This quite variable brown or blackish scorpion ranges widely in Mexico from the southern state of Guerrero northward to the Rio Grande River or beyond it into Texas. Hoffmann has assigned four distinct populations to *mexicanus*, regarding each as a subspecies:

Vejovis mexicanus mexicanus C. L. Koch: The Valley of Mexico.

Vejovis mexicanus smithi Pocock: The temperate parts of Morelos and borders of Guerrero.

Vejovis mexicanus dugesi Pocock: The mountains of Guanajuato.

Vejovis mexicanus decipiens Hoffmann: A northern subspecies with its type locality Batopilas, Chihuahua.

The several specimens from the Tres Mariás Islands probably represent a subspecies distinct from those enumerated above. Until more material from the adjacent mainland is available, it seems best merely to list them under the species *mexicanus*.

RECORD: *Nayarit*: María Magdalena Island, Tres Mariás Islands, March 29–31, 1957, R. Zweifel, four specimens.

Vejovis boreus Girard

Scorpio (Telegonus) boreus GIRARD, 1854, in Marcy, Exploration of the Red River of Louisiana in the year 1852, p. 257.

Vejovis silvestrii BORRELLI, 1908, Bol. Lab. Zool. Gen. Agraria, Portici, vol. 3, pp. 225–227.

Vaejovis boreus EWING, 1928, Proc. U. S. Natl. Mus., vol. 73, art. 9, p. 12.

This widespread species, to which Ewing gave the common name "northern scorpion," has a general distribution from the southern borders of the western Canadian provinces from British Columbia to Saskatchewan and southward to the Mexican border. It becomes less numerous southward, where it normally occurs in mountainous areas, but it may also be found in hot arid regions. The species named *silvestrii* by Borelli, with its type locality Sierra Madre, Los Angeles County, California, seems certainly to be this species, and the name is synonymized above. The examples from South Todos Santos Island agree closely with more northern specimens and represent the first record of *boreus* from Mexico.

RECORD: *Baja California Norte*: South Todos Santos Island, March 6, 1957, R. Zweifel, female and young male.

Vejovis baueri, new species

DIAGNOSIS: This is a small species of the *mexicanus* group in which the inferior median keels of the postabdomen are absent beneath the first segment but are distinct and granulated on segments III to V. The dorsum of the carapace is marked by two broad dark bands separated

by a narrow, central, pale stripe. The hands of the pedipalp lack keels and are quite smooth. The postabdomen is short and stout, with the caudal segments broader and more robust than the much broader than long basal segments. The vesicle of the sting, which is longer than the terminal spine, is only about four-sevenths as wide as the width of the fifth segment of the postabdomen.

This species is readily separated from the two species of its section, *Vejois granulatus* Pocock and *V. mexicanus* C. L. Koch, by the broad postabdomen and by numerous other features. It shows greater superficial resemblance to such species as *Vejois spinigerus* Wood and *V. bilineatus* Pocock, but these lack keels on the ventral surfaces of the postabdomen and belong in a different section of the genus. The broad, winged, caudal segments of *Vejois baueri* are not matched in any species of the North American fauna.

TYPE LOCALITY: West San Benito Island, Baja California Norte, female holotype and male allotype taken March 9, 1957, by R. Zweifel, in the American Museum of Natural History.

The general coloration is a clear yellow to dull orange, with faint to distinct dusky pattern. The dull orange carapace is lightly shaded with dusky and has the eye tubercles black. The dull orange abdomen is marked with a pair of broad brownish stripes the full length, between which lies a narrow pale stripe moderately widened behind, and at the sides of which are a series of pale patches along the margins. The venter of the cephalothorax and abdomen is clear dull yellow. The dorsum of the dull yellow postabdomen is somewhat darker behind and has a few dusky shadings. The venter is dusky brown, except on the side margins of the segments, with the duskiness concentrated to give a distinct lined appearance under low-power magnification, the four longitudinal lines centered on the median and sublateral keels. The vesicle of the sting is clear yellow, and the spine is dark red. The pedipalp is dull yellow to orange, with all segments somewhat dusky and an irregular dusky stripe above on the tibia. The paler yellow legs are banded with inconspicuous dusky lateral and dorsal stripes.

The longer than broad carapace is weakly emarginated at the center of the frontal border and is finely granulated over much of the surface. The abdominal tergites are quite uniformly roughened and set with small granules, many of which are concentrated in the caudal portion of each tergite. The last tergite presents a pair of carinae on each side set with heavy granules and some granules between these elevations. The under side of the abdomen and carapace is relatively smooth.

The postabdomen is short and stout, its length representing some-

TABLE 2
MEASUREMENTS (IN MILLIMETERS) OF *Vejovis baueri*, NEW SPECIES

	Female	Male
Total length	33.8	31.0
Carapace		
Length	4.8	4.5
Width at side eyes	2.7	2.6
Width at caudal edge	4.5	4.3
Abdomen		
Length	11.0	10.0
Width	5.4	5.1
Postabdomen, length	18.0	16.5
Segment I		
Length	2.0	2.0
Width	3.0	2.6
Segment II		
Length	2.2	2.1
Width	3.1	2.9
Segment III		
Length	2.5	2.3
Width	3.2	3.0
Segment IV		
Length	3.3	3.5
Width	3.6	3.3
Segment V		
Length	4.5	4.3
Width	3.3	3.2
Caudal segment, length	5.0	4.5
Vesicle		
Length	2.5	2.3
Width	2.1	2.0
Depth	1.4	1.2
Sting, length	1.7	1.7
Pedipalp, length	16.4	16.0
Femur		
Length	4.0	4.0
Width	1.1	1.2
Tibia		
Length	4.4	4.3
Width	1.6	1.5
Hand		
Length	8.0	7.7
Width	2.7	2.4
Thickness	1.8	1.7
Palm length	3.7	4.0
Movable finger, length	5.2	5.1
Combs, number of teeth	14	14

what more than half of the total length of the body. The first three segments are much broader than long, the fourth segment is slightly broader than long, and the fifth is longer than broad. The first to fourth segments bear dorsal and lateral, evenly granulated carinae and have a few scattered granules between them. The fifth segment in dorsal view is broadest in front, is gradually narrowed to a width still exceeding the width of the vesicle of the sting, and presents along the lateral margin a row of granules which lie nearly sessile on the rounded margin. The postabdomen is evenly convex as seen from below and is keeled as follows: ventral keels on first segment obsolete or nearly so, but the sublateral ones bear small granules; the median and sublateral keels on the second to fifth segments are distinct and granulated; the keels on the fourth and fifth segments are somewhat more distinct, and there are more scattered granules between the keels.

The pedipalp is of average length and stoutness. The femur is not fully four times as long as broad and has the keels distinct and granulated. The tibia, which is smoothly keeled on the outer side, is nearly three times as long as broad, has granulated keels on the inner side and a rounded enlargement bearing two granulated keels. The band is quite rounded and quite smooth, lacking keels on all surfaces. The movable finger is quite thin and slightly exceeds the carapace in length. The basal piece of the combs is quite wide, being about two-thirds as long as broad, and equals about half of the width of the comb. The chelicera bears the typical smooth keel on the lower margin of the movable finger.

Vejovis punctipalpus Wood

Buthus punctipalpi WOOD, 1863, Proc. Acad. Nat. Sci. Philadelphia, p. 109.

Vejovis punctipalpi BANKS, 1900, Amer. Nat., vol. 34, p. 424 (part); 1910, Pomona Jour. Ent., vol. 2, no. 2, p. 189 (part). HOFFMANN, 1931, An. Inst. Biol., Mexico, p. 402.

Vejovis punctipalpus EWING, 1928, Proc. U. S. Natl. Mus., vol. 73, art. 9, p. 10.

DIAGNOSIS: This species was based on material from Cabo de San Lucas, Baja California, collected by J. Xantus de Vesey nearly one hundred years ago. A male paratype from the collection of the United States National Museum is characterized as follows: The stout hands have well-marked granular crests, and the fingers are quite short and thick. The ventral keels on the postabdomen are all distinct and denticulate except the median and ventral keels on the first and second segments which are smoother. The caudal segment is especially long and thin, with the sting slender and longer than the vesicle.

TABLE 3
MEASUREMENTS (IN MILLIMETERS) OF *Vejois punctipalpus* WOOD

	Female Cotype	Male
Total length	53.6	67.6
Carapace		
Length	7.5	7.1
Width at side eyes	4.1	3.7
Width at caudal edge	6.3	6.0
Abdomen		
Length	12.3	18.5
Width	6.5	
Postabdomen, length	33.8	32.0
Segment I		
Length	3.6	3.5
Width	3.6	3.4
Segment II		
Length	4.4	4.0
Width	3.5	3.3
Segment III		
Length	4.5	4.3
Width	3.4	3.2
Segment IV		
Length	6.0	5.7
Width	3.1	2.8
Segment V		
Length	8.0	7.8
Width	3.1	2.7
Caudal segment, length	7.3	6.7
Vesicle		
Length	3.7	3.7
Width	2.2	2.0
Depth	1.8	1.7
Sting, length	3.7	3.2
Pedipalp, length	22.1	21.3
Femur		
Length	5.5	5.3
Width	2.1	2.0
Tibia		
Length	6.0	5.6
Width	2.5	2.2
Hand		
Length	10.6	10.4
Width	4.5	4.1
Thickness	3.5	3.3
Palm length	6.0	6.0
Movable finger, length	6.5	6.5
Combs, number of teeth	19	17

In 1910 Banks recorded *punctipalpus* from several California localities and placed the species next to *boreus* in his key. It seems clear that he was dealing with a different species with much longer hand and fingers. Ewing in 1928 reported this species as having a wide distribution in the southwestern part of the United States and adjacent Mexico. It seems probable that many, if not all, of these records should be referred to other species. If my appraisal of this species is correct, *Vejovis punctipalpus* will be found to have a much more limited distribution, probably not north of Baja California.

RECORDS: *Baja California Sur*: Cabo de San Lucas, J. Xantus de Vesey, female cotype. Miraflores, May 15, male.

Vejovis puritanus, new species

DIAGNOSIS: This is a medium-sized species of the *subcristatus* group in which the ventral keels on the abdomen are smooth on the second to fourth segments and are scarcely discernible on the first segment. It has the appearance of *Vejovis flavus* Marx of New Mexico and Arizona but is slightly more robust and has shorter fingers on the hand. In *flavus* the ventral keels are distinctly denticulate on the basal segments of the postabdomen. *Vejovis subcristatus* Pocock has been recorded from Arizona by Borelli and from other southwestern states by various workers. None of the species so far assigned to it is closely allied to *subcristatus* which lives in the southern states of Mexico.

TYPE LOCALITY: Santo Tomas, Baja California Norte, July 8, 1953, W. J. and J. W. Gertsch, male holotype, in the American Museum of Natural History.

OTHER RECORD: *California*: Jacumba, August 10, 1955, W. J. Gertsch, female allotype.

The general coloration is similar in both sexes and varies from yellow to dull orange with a faint dusky pattern. The dull orange carapace shows an indistinct dusky marbling and has the eye tubercles black and the caudal margin with a narrow black seam. The tergites of the preabdomen are faintly mottled with dusky and have the caudal margins with a narrow black seam. The postabdomen is a quite uniform dull orange, with the carinae somewhat darker. The pedipalpi and basal segments of the legs are dull orange, with dusky shadings. The terminal leg segments and the venter of the preabdomen are yellow.

The carapace is covered rather liberally with pale granules, those on the midline being somewhat larger. The quite smooth tergites of the preabdomen have scattered granules in front of the hind margin and a quite regular series on the side and caudal margin. The fifth tergite

TABLE 4
MEASUREMENTS (IN MILLIMETERS) OF *Vejovis puritanus*, NEW SPECIES

	Female	Male
Total length	55.1	47.1
Carapace		
Length	6.2	5.3
Width at side eyes	3.3	3.0
Width at caudal edge	5.1	4.4
Preabdomen		
Length	14.7	12.5
Width	5.7	4.7
Postabdomen, length	34.2	29.3
Segment I		
Length	3.8	3.4
Width	3.5	3.2
Segment II		
Length	4.2	4.0
Width	3.3	3.1
Segment III		
Length	4.7	4.0
Width	3.3	3.0
Segment IV		
Length	6.2	5.0
Width	3.3	3.0
Segment V		
Length	8.0	6.7
Width	3.0	2.6
Caudal segment, length	7.3	6.2
Vesicle		
Length	5.0	4.2
Width	2.6	2.3
Depth	2.0	1.7
Sting, length	2.3	2.0
Pedipalp, length	20.9	18.4
Femur		
Length	5.6	5.0
Width	1.5	1.3
Tibia		
Length	6.1	5.4
Width	1.7	1.7
Hand		
Length	9.2	8.0
Width	2.2	2.0
Palm length	4.3	4.0
Movable finger, length	6.0	5.2
Combs, number of teeth	18-19	19

bears the four typical crests, and these are distinctly granulated. The postabdomen is long and of medium thickness, with most of the carinae well marked. The dorsal and dorsal lateral carinae are prominently crested on the first four segments and are armed with distinct teeth, of which the caudal one on each segment is only slightly more prominent than the others. The fifth segment has the dorsal carinae rounded and toothed, but the dorsal lateral carinae are developed only in the basal half. The ventral median keels are faintly apparent on the first segment, are distinct and smooth on the second to fourth segments, and the median keel on the fifth segment is granulate. The ventral side keels are distinct on all the segments, are lightly denticulate on segments I to IV, and are more heavily granulated on the fifth segment. The rather slender caudal segment has the vesicle roughened behind and has a short curved sting half as long as the vesicle.

The pedipalp is of medium length, with the hand quite slender. The femur is nearly four times as long as broad and has the marginal carinae heavily granulated. The stouter tibia is only about three times as long as broad, is moderately rounded beneath, and has the carinae heavily granulated. The smooth hand has the basal portion as long as the fixed finger.

Vejovis eusthenura Wood

Buthus eusthenura Wood, 1863, Proc. Acad. Nat. Sci. Philadelphia, p. 109; 1863, Jour. Acad. Philadelphia, ser. 2, vol. 5, p. 360.

Wood's description of this unidentified species follows:

"B. EUSTHENURA: *B. aurantiaco-brunneus*; dorso tuberculis minimis asperato; cephalothorace haud emarginato, medio canaliculato; oculis lateralibus utrinque in serie curvata dispositis; palpi gracilibus longis, longe sparse pilosis; manibus parvis, haud tumidis, subcylindraceis; cauda modice longa, percrassa; spiculo brevissimo, valde curvato, sine spinulo basali; pectinis dentibus fere 17.

"The surface of the cephalothorax is rough and uneven. The hands are very small and smooth, with some traces of the eight facets so distinct in *B. punctipalpi*. The fingers are about as long as the hand, rather slender, with their opposing margins armed with a row of very sharp, minute teeth, and much larger ones placed at intervals on one side of their distal portion. The legs are somewhat compressed; very long and slender. The tail, when compared with the body, is very heavy. On the first four joints the superior and supero lateral crests are alone serrulate. The superior terminates in a spine, feebly pronounced on the fourth article. The inferior and infero lateral crests are distinct, but

not crenulate. The penultimate segment has well-marked, but not crenate, supero and infero lateral ridges, besides a single median inferior and median lateral on their proximal portion. The terminal joint resembles that of *B. punctipalpi*, but is much larger and thicker, and not so prolonged posteriorly. Sternal plate pentangular.

"Length of body, ♂ 7 lines: of tail, ♂ 13 lines.

"Hab.—Cape St. Lucas. J. Xantus de Vesey. Smithsonian Museum."

Hadrurus hirsutus Wood

Buthus hirsutus WOOD, 1863, Proc. Acad. Nat. Sci. Philadelphia, p. 108.

Hadrurus hirsutus HOFFMANN, 1931, An. Inst. Biol., Mexico, pp. 335–340, figs. 17–19.

This large, hairy scorpion occurs in California and western Arizona and ranges into Sonora and Baja California.

RECORD: *Baja California Norte*: Cedros Island, March 11, 1957, R. Zweifel, one specimen.

Anuroctonus phaeodactylus Wood

Centrurus phaeodactylus WOOD, 1863, Proc. Acad. Nat. Sci. Philadelphia, p. 111; 1863, Jour. Acad. Nat. Sci. Philadelphia, ser. 2, vol. 5, p. 372.

Anuroctonus phaeodactylus EWING, 1928, Proc. U. S. Natl. Mus., vol. 73, art. 9, p. 14. HOFFMANN, 1931, An. Inst. Biol., Mexico, pp. 403–405.

This very distinct scorpion ranges from Colorado and Utah to California and southward into Mexico.

RECORD: *Baja California Norte*: Seventeen miles south of Santo Tomas, August 31, 1957, V. Roth, male.

Syntropis macrura Kraepelin

Syntropis macrura KRAEPELIN, 1900, Abhandl. Gebiete Naturwiss., vol. 16, pt. 4, pp. 16–17.

This sizable vejovid (94 mm. in length), the type of a new genus, was not included by Hoffmann in his work on the Mexican scorpion fauna and, to my knowledge, has not been reported since. Kraepelin placed it near *Vejovis*, with which it agrees in having the lower margin of the movable finger of the chelicera without teeth, but from which it differs conspicuously in having a single median keel on the venter of the postabdomen. Werner in 1935 (*in* Bronn, Klassen und Ordnungen des Tierreichs, Scorpiones, Pedipalpi, p. 281) gives the genus subfamily status within the Vejovidae and cites the locality as California, instead of Baja California.

TYPE LOCALITY: *Baja California*: No specific locality cited; male type in the Muséum National d'Histoire Naturelle, Paris.

Paruroctonus mesaensis Stahnke

Paruroctonus mesaensis STAHNKE, 1957, Ent. News, Philadelphia, vol. 68, pp. 253-259, fig. 1.

DIAGNOSIS: This uniformly golden yellow to orange scorpion is considerably larger than the genotype, which is the only other known species and was named *Uroctonoides gracilior* by Carlos Hoffmann on the basis of four males from Tepezala, Aguascalientes. The male type and two male paratypes of *gracilior*, which are in the collection of the American Museum of Natural History, measure under 50 mm., whereas males of *mesaensis* exceed 60 mm. in length. The carapace and trunk of *gracilior* have a distinct dusky pattern, and there are dusky shadings on the postabdomen and appendages. In the chelicerae of both species of this genus the carina of the lower margin of the movable finger is developed into a series of rounded lobes or teeth. These teeth are not pigmented and differ widely from specimen to specimen in number, size, and position. The robust hand of *mesaensis* is proportionately longer, with longer fingers than those of *gracilior*. The setae on the distal segments of the legs are long, numerous, and set in a linear series in *mesaensis*, whereas in *gracilior* they are few and more scattered.

TYPE LOCALITY: Northwest of Mesa, Arizona; female holotype in the collection of Arizona State College.

OTHER LOCALITIES: *Baja California Norte*: San Felipe, June 15, 1952, W. J. Gertsch, female. *Sonora*: Puerto Penasco, July 30, 1956, M. A. Cazier, two males. *California*: Borrego Springs, J. Elliott, male. Indian Wells, C. M. Bogert, male. Twentynine Palms, July-August, 1945, Jefferson H. Branch, 20 males, females, and young specimens.

The entire body is clear golden yellow except for the small black eye tubercles, the tiny inconspicuous reddish articulation spots at the ends of the leg segments, and the bright red tip of the sting.

The carapace is very finely roughened (essentially smooth under low power) and bears rows of pale granules which occur mostly in the caudal half. The tergites of the abdomen are quite smooth except along the sides, which have a marginal row of granules, and the caudal half of each which has on the sides two distinct rows and a few scattered granules. The hind tergite has the four carinae distinct and more heavily granulated, and these also have scattered granules between them. Most of the dorsal keels on the postabdomen are distinct and evenly granulated. The lateral dorsal keels on the fifth segment of the postabdomen

TABLE 5
MEASUREMENTS (IN MILLIMETERS) OF *Paruroctonus mesaensis* STAHNKE

	Female	Male
Total length	78.9	63.5
Carapace		
Length	9.2	7.0
Wide at side eyes	5.5	4.2
Width at caudal edge	8.1	6.4
Abdomen		
Length	21.5	15.7
Width	9.5	6.5
Postabdomen, length	48.2	40.8
Segment I		
Length	5.0	4.3
Width	3.5	3.1
Segment II		
Length	6.5	5.5
Width	3.0	2.7
Segment III		
Length	7.0	6.0
Width	3.1	2.6
Segment IV		
Length	8.7	7.5
Width	2.8	2.5
Segment V		
Length	11.0	9.5
Width	2.7	2.4
Caudal segment, length	10.0	8.5
Vesicle		
Length	6.0	5.0
Width	2.8	2.1
Depth	2.7	2.0
Spine, length	4.0	3.0
Legs		
Fourth femur		
Length	11.0	8.5
Width	1.6	1.3
Fourth tibia		
Length	7.0	5.7
Width	2.0	1.7
Pedipalp, length	32.1	25.8
Femur		
Length	8.1	6.0
Width	2.3	1.7
Tibia		
Length	8.0	6.3

TABLE 5—(Continued)

	Female	Male
Width	3.2	2.5
Hand		
Length	16.0	13.5
Width	5.3	4.8
Depth	4.3	3.3
Palm length	8.3	
Movable finger, length	10.0	7.5
Combs, number of teeth	25	32

are smoother and show fewer granules. The inferior lateral keels are keeled on all segments but more weakly on the basal segment. The inferior median keels are smooth on the first and second segment, weakly granulated on the third, and more strongly granulated on the caudal segments. The smooth sting is long and slender, and the terminal spine is scarcely at all curved.

The pedipalp is of average length, being about three and one-half times the length of the carapace, and the hand is robust. The femur is three and one-half times as long as broad and has all the carinae coarsely granulated. The tibia is thicker, less than three times as long as broad, and has the inner carinae developed to an obtuse spur and all the carinae coarsely granulated. The hand is broad and quite thick, with all the carinae distinct and coarsely granulated. The movable finger is five-eighths as long as the total segment.

The legs are proportionately longer than those of *gracilior* and have thinner tibiae, the fourth tibia being 3.35 times as long as broad as compared with 2.65 times in *gracilior*. A series of 13 long setae are found on the basitarsus of *imperialis*, almost twice as long as the basal width of the segment, whereas in *gracilior* only four or five short ones are found.

FAMILY BUTHIDAE

Centruroides elegans Thorell

Centrurus elegans THORELL, 1877, Atti Soc. Italiana Sci. Nat., vol. 19, p. 145.

Centruroides insularis POCKOCK, 1902, Biologia Centrali-Americana, Arachnida, Scorpionida, p. 24.

Centruroides elegans HOFFMANN, 1932, An. Inst. Biol., Mexico, pp. 320–324, figs. 82–85.

This distinctively marked species has a venom of high virulence, but it is ranked well below the dangerous Durango and Nayarit scorpions.

Its typical form occurs in the western part of the state of Jalisco and to some extent in adjacent Nayarit, where it lives in the same areas as the very venomous *Centruroides noxius*. It also occurs on the Tres Mariás Islands, from which it was first recorded by Pocock under the name *insularis*. Another allopatric subspecies, *Centruroides elegans meisei*, is found in the coastal region of Guerrero.

RECORDS: *Nayarit*: Tres Mariás Islands: María Magdalena Island, March 29–31, 1957, R. Zweifel, two males, three females. María Madre Island, March 25, 1957, R. Zweifel, female.

Centruroides pallidiceps Pocock

Centruroides elegans, subspecies *pallidiceps* Pocock, 1902, *Biologia Centrali-Americana*, Scorpiones, Pedipalpi, and Solifugae, p. 24.

Centruroides pallidiceps Hoffmann, 1932, *An. Inst. Biol., Mexico*, pp. 325–328, figs. 86–87.

This very pale species lives in the hot, dry, coastal regions of Nayarit, Sinaloa, and Sonora, occurring northward one-third of the length of the latter state. Its venom is said to be comparable in virulence to that of the Arizona *sculpturatus* but far less toxic than that of *Centruroides suffusus* of Durango. The records below are the first for Baja California.

RECORDS: *Baja California Sur*: Puerto Magdalena, Isla Magdalena, March 16–17, 1957, R. Zweifel, male and female. One mile southeast of Puerto Cortes, Santa Margarita Island, March 18–19, 1957, R. Zweifel, two males, two females, and one juvenile.

Centruroides exilicauda Wood

Buthus exilicauda Wood, 1863, *Proc. Acad. Nat. Sci. Philadelphia*, p. 107.

Centruroides exilicauda Ewing, 1928, *Proc. U. S. Natl. Mus.*, vol. 73, art. 9, p. 18. Hoffmann, 1932, *An. Inst. Biol., Mexico*, pp. 349–352, fig. 98.

This striped scorpion has the normal spine below the sting greatly reduced in size or seemingly absent. It is reported as ranging throughout Baja California and also occurs sparingly in adjacent California.

RECORDS: *Baja California Norte*: South Todos Santos Island, March 6, 1957, R. Zweifel, three males. Seventeen miles south of Santo Tomas, August 31, 1957, V. Roth, one male.

Centruroides zweifeli, new species

DIAGNOSIS: This small, dusky brown species is similar in appearance to *Centruroides noxius* Hoffmann of the Mexican state of Nayarit. It completely lacks light and dark longitudinal stripes on the dorsum of the abdomen, which is quite uniform brown to the side margins. It is

TABLE 6
MEASUREMENTS (IN MILLIMETERS) OF *Centruroides zweifeli*,
NEW SPECIES, FEMALE

Total length	31.1
Cephalothorax	
Length	3.6
Width at side eyes	2.1
Width at caudal edge	3.7
Abdomen	
Length	9.5
Width	5.0
Postabdomen, length	18.0
Segment I	
Length	2.5
Width	1.8
Segment II	
Length	3.0
Width	1.7
Segment III	
Length	3.1
Width	1.6
Segment IV	
Length	3.3
Width	1.4
Segment V	
Length	4.0
Width	1.4
Caudal segment, length	3.6
Vesicle	
Length	2.2
Width	1.1
Depth	1.2
Sting, length	1.7
Pedipalp, length	14.0
Femur	
Length	3.3
Width	0.8
Tibia	
Length	4.1
Width	1.5
Hand	
Length	6.6
Width	1.4
Depth	1.2
Palm length	2.7
Movable finger, length	4.3
Combs, number of teeth	20

less granulose than *noxius* and has the spine under the sting reduced to a small point. The only other species of this genus known within its range is *Centruroides exilicauda* Wood, a slender, yellow species with dark stripes.

TYPE LOCALITY: San Martín Island, Baja California Norte, female holotype taken March 8, 1957, by R. Zweifel, in the American Museum of Natural History.

The base color is yellow to dull orange, but much of it is masked by dusky brown shadings. The carapace, which is mostly dusky brown, with yellow patches at each side of the median eyes and larger yellow patches behind, has a narrow, marginal, linear seam all around the borders. The tergites of the abdomen are also dusky brown, with a darker marginal seam, and have lighter marbling on all segments. The venter of the carapace and abdomen is clear dull yellow. The postabdomen is dull orange, brightest behind, but is dusted with brown above and more heavily marked beneath to form indistinct longitudinal brownish lines and stripes. The caudal segment has the tip of the spine reddish brown. The pedipalps are quite dusky brown, with a few pale spots on the tibia and the movable finger yellowish. The legs are strongly to inconspicuously banded with brown on the sides.

The carapace is quite finely granulated over most of its surface, is about as broad as long, and is slightly emarginated in front. The abdominal tergites are finely roughened in front but more coarsely granulated behind and especially along the caudal margins. The four carinae on the last abdominal tergite are distinct and granulated. The venter of the abdomen is smooth except along the side margins. The postabdomen has all the keels distinct and set with fine granules. The caudal segment has the vesicle of typical size and shape and presents a tiny spur just below the sting. This is always well developed in *noxius*.

The pedipalps are a little less robust than those of *noxius*. The femur is four times as long as broad and has the keels finely granulated. The thickened tibia, which is not quite three times as long as broad, has the keels finely granulated and has a small sharp spine at the base of each inner keel. The hand has the keels all finely granulated.

The basal piece of the combs, which has been damaged, is a caudally rounded lobe nearly two-thirds as long as broad and seems to lack a median indentation.